WHAT IS CLAIMED IS:

1. A substrate processing chamber having at least one component bearing a rare earth-containing coating bound to a parent material by an intervening adhesion layer, such that the component exhibits resistance to etching in a plasma environment.

2. The substrate processing chamber of claim 1 wherein said rare earth-containing coating is selected from the group of Yttrium fluoride, Yttrium oxides, Yttrium-containing oxides of Aluminum, Erbium oxides, and Neodymium oxides.

3. The substrate processing chamber of claim 1 wherein the component is selected from the group comprising a chamber liner, a chamber dome, a chamber wall, a cover plate, a gas manifold, a faceplate, a substrate support, and a substrate support/heater.

4. The substrate processing chamber of claim 1 wherein the adhesion layer comprises a graded subsurface layer of rare earth material formed in the surface of the parent material.

5. The substrate processing chamber of claim 4 wherein the adhesion layer comprises a subsurface rare earth layer resulting from a changed energy of bombardment during introduction of rare earth material into the parent material through an IBAD process.

6. The substrate processing chamber of claim 4 wherein the adhesion layer comprises a subsurface rare earth layer resulting from a changed implantation energy during introduction of rare earth material into the parent material through a MEPIIID process.

7. The substrate processing chamber of claim 1 wherein the parent material comprises aluminum nitride or aluminum oxide.

8. A method for treating a parent material for corrosion resistance to plasma comprising:

forming an adhesion layer over a parent material; and

forming a rare earth-containing coating over the adhesion layer.

9. The method of claim 8 wherein the rare earth-containing coating is formed by deposition of rare earth-containing material.

10. The method of claim 9 wherein rare-earth ions are introduced by conducting reactive sputter deposition in an oxygen-containing ambient.

11. The method of claim 8 wherein the adhesion layer is formed by introducing rare earth metals into the parent material at varying energies to form a graded implant layer.

12. The method of claim 11 wherein the adhesion layer is formed by an ion bombardment assisted deposition (IBAD) technique employing bombardment of a deposited rare earth layer with inert Argon ions at changed energies.

13. The method of claim 11 wherein the adhesion layer is formed by accelerating rare-earth ions at the parent material at changed energies of implantation.

14. The method of claim 13 wherein rare-earth ions are accelerated using a MEPIIID ion implanter.

15. The method of claim 8 wherein the rare-earth containing coating is formed by exposing a rare earth present on a surface of the parent material to a fluorine ambient.